Space Weather Forecast

Issued on Sunday, 26 March 2023 at 12:03 Local

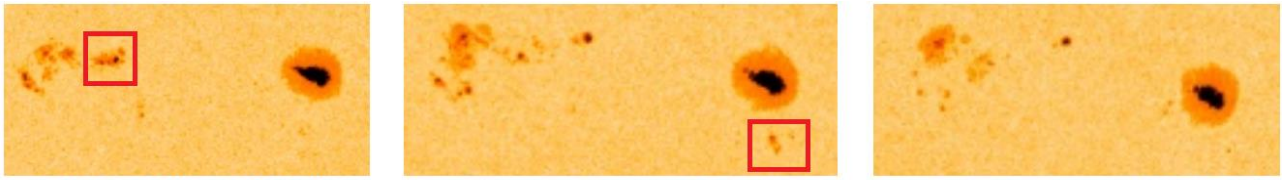
This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Chance of R1 Minor radio blackouts.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been low over the past 24 hours, with occasional minor Common-class flares recorded. These flares peaked with a small common class at 26/0406UTC, with this appearing to emanate from the largest and most complex group on the Sun. This group showed a slight decrease in area over the 24 hours. Activity around the time of this peak flare was part of a general brightening in near X-ray wavelengths around the southwestern sunspot groups including the largest.

Figure 1: 48-hour evolution of the largest and most complex sunspot group in visible satellite imagery, showing the development and fading of potentially unstable features (boxed red – like 'double-yolked' eggs). These had no appreciable effect on X-ray activity however.



AR3256 HMIIF 24/1145UTC 25/1145UTC 26/1145UTC

There are now up to nine sunspot regions on the facing side of the Sun including the above. The only noteworthy growth trend in any spot group of the period was in the northwest, although this was with no accompanying flare activity.

Perhaps the most notable event on coronagraphs of the 24 hours was an eruptive flare from an active region in the southeastern part of the Sun around 26/0500UTC. This event has translated into ejecta seen heading largely south and east on imagery and will shortly be analysed. With the possible marginal exception of this Coronal Mass Ejection (CME) pending analysis, at the time of writing no Earth-directed CMEs were observed in available imagery.

Solar Wind / Geomagnetic Activity: The solar wind showed Earth as transiting a sector of space associated with a fast regime. The solar wind speed rose slightly in the period through elevated levels, however the number of particles in the wind was roughly level and near background, while their associated magnetic field was within its typical range, with the north-south component variable in character and spending no protracted amounts of time either co- or anti-aligned with Earth's field (to lesser or greater effect respectively).

The net result of the above solar wind measures was for mainly quiet geomagnetic activity throughout.

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Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is most likely to remain low, but with a chance of becoming Moderate with any isolated Moderate-class X-ray flares. The main region likely to give such flares is the largest and most complex in the southwest.

Solar Wind / Geomagnetic Activity: No Earth-directed CMEs feature in the forecast. Earth is currently being affected by a fast wind from a 'coronal hole' and speeds are likely to remain elevated through the remainder of day 1 (Sunday 26 March) before beginning to slowly ease thereafter.

Geomagnetic activity should peak early in the forecast period, albeit below Minor Geomagnetic Storm G1, before becoming largely quiet once again from day 2 (Monday 27 March) as the fast wind wanes.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, but there remains a slight chance of reaching S1 or greater, should any significant flares occur.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	5	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

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Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	25	25	25	25
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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